

Claims

What is claimed is:

1 1. A pulse valve (24, 124, 122) for providing high
2 frequency pulses of a fluid medium, comprising:
3 a housing (50; 140, 140'; 240, 240') containing
4 a plenum chamber (74, 174, 274);
5 means (76, 78, 178, 278) for supplying the
6 fluid medium under pressure to the plenum chamber (74,
7 174, 274);
8 a pair of members (40, 42; 140, 142; 240, 242)
9 mutually juxtaposed in close, facing relation and
10 having respective slots (44, 46; 144, 146; 244, 246)
11 therein, one member (42, 142, 242) of the pair of
12 slotted members (40, 42; 140, 142; 240, 242) being
13 adapted to rotate relative to the other (40, 140, 240)
14 to successively align and unalign, and thus port and
15 unport, the slots (44, 46; 144, 146; 244, 246) in the
16 two members, the pair of members (40, 42; 140, 142;
17 240, 242) defining a boundry of the plenum (74, 174,
18 274); and
19 means (70, 54, 52; 194) for rotatingly driving
20 one member (42, 142, 242) of the pair relative to the
21 other (40, 140, 240) at a predetermined speed to
22 provide successive pulses of the fluid medium at the
23 high frequency.

1 2. The pulse valve (24) of claim 1 wherein the pair of
2 slotted members (40, 42) comprise a stationary member
3 (40) fixedly mounted in the housing (50), and a disk
4 (42) rotatably mounted in the housing (50) adjacent to
5 and upstream of the stationary member (40) relative to
6 the direction of the supply of the fluid medium to the
7 plenum chamber (74), the rotatable disk (42) being
8 mounted to allow limited axial displacement whereby the

9 pressure of the fluid medium urges the rotatable disk
10 (42) into close sealing relation with the stationary
11 member (40).

1 3. The pulse valve (24) of claim 2 including spring
2 means (72) operatively disposed for urging the
3 rotatable disk (42) relatively toward the stationary
4 slotted member (40) to enhance the relative seal
5 between the disk (42) and the stationary slotted member
6 (40).

1 4. The pulse valve (24) of claim 3 wherein the
2 rotatable disk (42) includes an axially located, shaped
3 seating recess (71'), and the means (70, 54, 52) for
4 rotatingly driving the disk (42) comprise a rotary
5 motor (52), a drive shaft (54) connected to the motor
6 (52) and a shaped driver (70), the drive shaft (54)
7 including a shaped recess (68) extending axially in its
8 distal end, the proximal end of the shaped driver (70)
9 being slidably disposed in the shaped recess (68) of
10 the drive shaft (54) and shaped to prevent rotation
11 relative to the drive shaft (54), the distal end of the
12 shaped driver (70) including a shaped head (71), the
13 shaped head (71) and the shaped seating recess of the
14 rotatable disk (42) being cooperatively shaped for
15 mated rotary driving engagement and limited floating
16 axial and wobble displacement of the rotatable disk
17 (42), and wherein the spring means (72) comprise a
18 compression spring disposed in the shaped recess (68)
19 of the drive shaft (54) and acting on the shaped driver
20 to bias its shaped head (71) into the shaped seating
21 recess of the rotatable disk (42).

1 **5.** The pulse valve **(24)** of claim **3** wherein the fluid
2 medium is a gaseous propellant for a pulse detonation
3 engine **(10)**, the opposed facing faying surfaces of the
4 fixed member **(40)** and the rotatable disk **(42)** are
5 ground to precision flatness and finish, and the number
6 of slots **(44 or 46)** in at least one of the fixed member
7 **(40)** and the rotatable disk **(42)** is at least about ten.

1 **6.** The pulse valve **(24, 122, 124)** of claim **1** wherein
2 the pair of slotted members **(40, 42; 140, 142; 240,**
3 **242)** comprise a stationary member **(40, 140, 240)**
4 fixedly mounted relative to the housing **(50; 140, 140';**
5 **240, 240')** and a disk **(42, 142, 242)** rotatably mounted
6 relative to the housing **(50; 140, 140'; 240, 240')** and
7 adjacent to the stationary member **(40, 140, 240)**, the
8 rotatable disk **(42, 142, 242)** being mounted to allow
9 limited axial displacement, and including spring means
10 **(72, 172)** operatively disposed for urging the rotatable
11 disk **(42, 142, 242)** relatively toward the stationary
12 slotted member **(40, 140, 240)** to enhance relative
13 sealing between the disk **(42, 142, 242)** and the
14 stationary slotted member **(40, 140, 240)**.

1 **7.** The pulse valve **(24, 122, 124)** of claim **6** wherein
2 the fluid medium is a gaseous propellant for a pulse
3 detonation engine **(10)**, the opposed facing faying
4 surfaces of the fixed member **(40, 140, 240)** and the
5 rotatable disk **(42, 142, 242)** are ground to precision
6 flatness and finish, and the number of slots **(44, 46;**
7 **144, 146; 244, 246)** in at least one of the fixed member
8 **(40, 140, 240)** and the rotatable disk **(42, 142, 242)** is
9 at least about ten.